cause an impression in printer's ink of the ends of the first three fingers of the right hand of each recruit passed by them as fit for the service, to be made on the Nominal Roll opposite the name of the recruit; and in the case of the Army Hospital Corps, in the Verification Roll.

A specimen of the required impression is shown below.

By order.
(Signed) C. H. Pearson, Surgeon-Major,
Secretary to the P.M.O., H.M.'s Forces in India.
[Here follows the specimen impression.]

I trust that the medical officers who will have to take these prints, understand the importance of using so little ink that the impression shall be *clear*, though its tint may be only brown and not black; also that when comparing two prints they will use a low power lens and four pointers, two for each print. I have lately been using a watchmaker's glass of two-inch focus, secured to the end of a long and counterpoised arm, which turns, not too easily, round the screw by which it is attached to its support. The lens can be brought into focus with great ease, and it remains steady when left alone. I use at least two pointers for each print. They are T-shaped; their long arms are six or seven inches long, they are roughly made of wood as thick as the thumb, so that they are purposely not over light. Each pointer stands on three supports, viz. on the point of a bent pin, whose headless body has been thrust into the end of the long arm of the T, and on the ends of two nails, or better on staples, one of which is driven under either end of the cross-arm. It is most easy to adjust the point of the bent pin upon any desired character in the finger-print. Both hands of the observer are thus left free to manipulate other pointers, when desired. The stationary pointers are a great help in steadying the eye while pursuing a step by step comparison between two finger-prints.

Francis Galton.

NOTES.

The collected works of Jean Servais Stas, which it is proposed to publish as a mark of honour to his memory, form three quarto volumes of about 500 or 600 pages each. The first volume contains the memoirs and papers relating particularly to the determination of atomic weights; the second comprises notes, reports, and lectures; and the third, posthumous works, which especially refer to spectroscopic researches. The edition is under the direction of MM. Spring and Defaire, and it will probably be completed in about a year. The three volumes will be published simultaneously at the uniform price of thirty francs. Subscribers of twenty francs or more to the Stas memorial fund will each receive a copy of the work, and contributors of less than twenty francs may increase their contributions to that sum, and so become a recipient. The names of subscribers will be published in an appendix to the third volume. After the completion of publication, the balance of the fund will be used for the erection of a monument. Stas' scientific work is more than sufficient to perpetuate his name among men of science, and the monument which it is proposed to erect will make it "known to all people."

At the second day's meeting of the Photographic Congress, the opening of which was noted in our last issue, Mr. Andrew Pringle read a paper on "The Present Position of Micro-Photography," and W. Weissenberger contributed one on "A Process of Photo-Mechanical Printing in Natural Colours." The president, Capt. Abney, read a paper dealing with "Exposure and Chemical Action," in which he showed that the sum of excessively small exposures is not equivalent to the same exposure given at one time, and further, that very feeble intensity of light fails to produce the calculated amount of chemical action. Capt. R. H. Hills followed with a description of the instruments employed and the results obtained during the recent solar eclipse. At the final meeting of the congress, on October 12, Dr. A. Miethe read a paper on "The Practical Testing of Photographic Objectives," and Dr. P. Rudolph one on "The Measure and Numeration of the Stops of Photographic Lenses."

A statue of Duhamel-Dumonceau was unveiled at Pithiviers, on October 1. The French Minister of Agriculture, who performed the ceremony, claimed that Dumonceau was the first to institute agricultural experiments in the field.

Dr. H. Möller has been appointed Professor of Botany in the University of Greifswald.

At the meeting of the International Geodetic Association, recently held at Geneva, a Commission, composed of M. Tisserand, with Profs. Foerster and Schiaparelli, was appointed to draw up a programme of observations to be made permanently at a number of different places in order to elucidate the question of latitudinal variations. The association will hold its annual meeting in Austria next year.

The *Lancet* says that the Apothecaries' Society are about to apply to the courts for powers to sell their Botanical Gardens at Chelsea, the money value of which has been fixed at about £30,000. The removal of this historic garden would be a source of keen regret to the many who have profited by the instruction conveyed by its means.

We are informed that the fund raised for paying the costs of Dr. Wallis Budge in the recent action of Rassam *v.* Budge has been fully subscribed. The list of the contributors, which is too long to print in its entirety, includes the following names:—Miss H. M. Adair, the Duke of Argyll, K.G., K.T., Lord Armstrong, C.B., the Marquis of Bath, Walter Besant, Dr. C. Bezold, Rev. H. Blunt, E. A. Bond, C.B., the Earl Cadogan, K.G., the Earl of Carlisle, Somers Clarke, N. G. Clayton, Miss Clendinning, Alfred Cock, Messrs. Thos. Cook and Son, Sir John Evans, K.C.B., F.R.S., Sir W. H. Flower, K.C.B., F.R.S., C. Drury Fortnum, A. W. Franks, C.B., F.R.S., Right Hon. W. E. Gladstone, M.P., Rev. Canon Greenwell F.R.S., Major-General Sir F. Grenfell, G.C.M.G., K.C.B., H. Rider Haggard, Lawrence Harrison, Thomas Harrison, James Hilton, Thomas Hodgkin, Sir H. H. Howorth, K.C.I.E., M.P., F.R.S., Right Hon. Thomas Huxley, F.R.S., Sir Frederick Leighton, Bart., P.R.A., William Lethbridge, Rev. W. J. Loftie, Right Hon. Sir John Lubbock, Bart., M.P., F.R.S., Lady Meux, F. D. Mocatta, Walter Morrison, Sir Frank Mowatt, K.C.B., Sir Charles Nicholson, Bart., D.C.L., the Duke of Northumberland, K.G., F. G. Hilton Price, Hon. W. F. D. Smith, M.P., E. Maunde Thompson, C.B., Cecil Torr, Sir Reginald Welby, G.C.B., John White.

New and extensive electrical works were inaugurated at Blackpool at the end of last week. In the course of a speech made during the celebrations, Lord Kelvin expressed the opinion that municipal corporations were right to take into their hands everything calculated to further the general good of the borough. It seemed to him that the Government ought to take up the whole business of telegraphs and telephones, and it would not be an improper thing if the whole railway system of the country were placed under the same management.

An International Congress on Aerial Navigation formed one of the series of congresses which have recently been held at Chicago. The papers read on that occasion are being published in the form of a supplement to the *American Engineer*, together with other information relating to aeronautical engineering. The new publication is given a distinctive title, *Aeronautics*, but whether it will be continued after the whole of the proceedings of the aeronautical conference have been issued will depend upon the success of the enterprise.

THE first International Botanical Congress ever convened on American soil was held at Madison, Wis., immediately after the adjournment of the American Association for the Advancement of Science, August 23 and 24. The foreign representation, however, was so small that the title of the meeting was changed to the "Madison Botanical Congress." The meeting was an outgrowth of that at Genoa last year. Prof. E. L. Greene, of California, was elected president. All the subjects discussed at the meeting referred to terminology, the following being the topics:—(1) Plant diseases; (2) anatomy and morphology; (3) physiology; (4) horticultural forms; (5) bibliography. It is expected that the next meeting will be held in Europe in 1894, but the precise time and place was not announced.

THAT Traugott Friedrich Kützing, the author of the *Phycologia generalis*, should have been still with us until within the last few weeks will probably be a surprise to many. As an author, Kützing had indeed completely disappeared from the scientific world; he had published nothing for more than twenty years, and nearly all his most important works appeared before the close of the first half of the present century. He may indeed be regarded as the founder of a scientific study of the Algæ, especially of sea-weeds. Much of his work has, of course, been superseded by more recent investigations; but his *Phycologia generalis*, published in 1843, his *Tabulæ Phycologicæ*, issued in twenty volumes from 1845 to 1870, with 2000 illustrations, and his *Species Algarum*, 1849, are still classical works, which must needs be in the hands of every student of the lower forms of vegetable life, if it is only for the excellence and life-likeness of their illustrations. In 1841 he published the *Umwandlung niedrer Algenformen in höhere*, and in 1844 the *Die kieselschaligen Bacillarien oder Diatomen*, the introduction to our knowledge of the structure of the diatom-shell, in which there is now so extensive a literature. Kützing died on September 9, at Nordhausen, in the 87th year of his age. His extensive collection of dried Algæ has long been in the possession of the University of Leyden.

MR. G. W. YOUNG has issued "A Key-table showing the characteristics of the principal Natural Orders of the British Flora," compiled for the use of students. A very brief synopsis is given of the leading characters of each natural order, and a familiar plant is mentioned as a "type." A few small corrections might be made in a subsequent edition. Thus, *Dielytra spectabilis* is the gardener's, not the scientific, name of the plant indicated; in the Caryophyllaceæ the "free central placentation" is by no means universal.

FEW geographers of the present day enjoy so wide a reputation as Baron F. von Richthofen, Professor of Geography in Berlin University, and it is pleasant to observe the fitting way in which his former students did honour to the sixtieth anniversary of his birth on May 5, 1893. Many of them wrote papers, either on geographical or geological subjects, for special publication in the form of a handsome book, "Festschrift," bearing Baron von Richthofen's portrait as frontispiece. Among the contributors we note the names of A. Philippson, F. Frech, H. Yule Oldham, C. E. M. Rohrbach, and E. Hahn.

DR. A. PHILIPPSON'S contribution to the "Festschrift" is an interesting investigation of the "Types of Sea-coasts" (Ueber die Typen der Küstenformen). Dr. Philippson insists upon the study of the simplest types of form and the individual relationship of these types to the groups of natural agents which produce them. He shows how all sea-coasts may be reduced to two great and fundamental types. (1) Isohypsal coasts, where the existing form of the coast-line still coincides with the primary relief of the earth's surface at that part, so that we may trace its origin from tektonic, volcanic, or other earth movements. (2) Thalassogenic coasts, where the primary isohypsal condition of the coast-line has been in greater or less degree obliterated by the action of "littoral forces." Dr. Philippson gives particular prominence to the flat-beach variety of thalassogenic coasts, and describes in detail the purely potamogenic type due to the action of inflowing rivers, the purely thalassogenic type due to the action of breakers, and to the building-up and breaking-down of "strand-walls." Lastly, the mixed potamogenic and thalassogenic type combining the characteristics of both. Numerous examples are drawn from familiar European coast-lines, and several diagrams are given.

A paper on "The Mechanical Genesis of the Form of the Fowl's Egg," was read before the American Philosophical Society on April 21. In it Dr. J. A. Ryder gives evidence that the configuration of the outline of the hen's egg is determined by mechanical means while the egg membranes and shell are in the process of formation within the oviduct. "The pressure preventing the passage of the elliptical mass down through an elastic tube must be developed largely in the form of friction, and the resistance of the walls of the oviduct to dilation. To overcome this a greater pressure must be exerted on the elliptical egg-mass at a point above its minor axis than below the latter. This will tend to squeeze part of its substance, since it is at last enclosed in an elastic capsule before shell-formation takes place, into the lower or larger end of the mass. In this way the ovoidal form of the egg seems to have first arisen." It therefore appears that the development of the figure of the eggs of birds is a purely dynamical problem, or one in which energy is applied in a definite manner to the plastic surface of a mass in statical equilibrium within the oviduct. This principle has many extensive applications, and may lead to the elucidation of several obscure points connected not only with the eggs of birds, but also those of reptiles and insects.

IN a letter to *Science* for September 15, Mr. O. T. Mason relates the discovery at the World's Columbian Exposition of two examples of the Mexican atlatl, or throwing-stick, lying in the Colorado Alcove. His description is as follows:—The shaft is a segment of a sapling of hard wood. At the distal end is a shallow gutter and a hook to receive the end of a spear-shaft. At the proximal end or grip in the more perfect specimen, about four inches from the extremity, is a loop on either side of the stick, one for the thumb, the other for the forefinger. The remaining three fingers would be free to manipulate the spear-shaft. These loops were made by splitting a bit of raw hide, sliding it down the proper distance on the stick, forming loops less than an inch in diameter by bringing the projecting ends of the raw hide, and seizing it fast to the shaft. Below the finger-loops or stirrups were a long chalcedony knife or arrow-blade, the tooth of a lion, and a concretion of hematite seized by a plentiful wrapping of yucca cord. Mr. Mason believes that the Bourke example from Lake Patzcuaro belongs also to the same outfit. This is the first instance, as he says, of "finding the ancient atlatl figured in the codices, and described by Mrs. Nuttall." A connection between the cliff dwellers and the Mexican peoples is thus indicated.

DR. G. SCHOTT contributes to a recent number of *Globus* an account of the Atlas of the Indian Ocean, published by the *Deutsche Seewarte*, with particular reference to the behaviour of the storms of the tropical part of that ocean. The article plainly shows that whereas some twenty years ago the Germans were dependent on the labours of English seamen for their sailing directions, they now rely almost entirely on their own publications, except as regards nautical charts. Dr. Schott gives an intelligible account of the older or circular theory of storms, and of the later, or spiral theory, to which attention was drawn by Dr. Meldrum, in 1860. If the former theory be correct, a ship which in a given position might safely run across the path of an advancing storm, would according to the later theory run into the most dangerous part of it. Between these theories seamen must therefore have great difficulty in shaping a correct course at the most critical time, and every careful investigation into the movements and laws of storms should be welcomed, in the interest of science, whether undertaken by this country or by foreign nations.

IN connection with the science meetings at the Chicago Exhibition, Dr. M. A. Veeder read a paper on periodic and non-periodic fluctuations in the latitude of storm tracks, in which he referred to the occasional rearrangements in the distribution of the atmosphere, consisting, in the main, in the displacement of the belts of high pressure on each side of the equator, with the consequent deflection northward or southward of the usual courses taken by storms. Notable instances of this kind have occurred at different times, such as in 1877–8 and in 1888–9, and the present year also affords another example, the winter in northern latitudes being distinguished by a severity in strong contrast to their mildness during the years above mentioned. These rearrangements of weather conditions on a large scale make it difficult, the author considers, to resist the conclusion that the atmosphere as a whole is under the control of forces which have a common origin, and depending upon some form of solar variability. Although it is not yet beyond dispute whether the sun is hottest or coldest when most free from spots, the evidence appears conclusive that the weather conditions in question bear some sort of relation to the spottedness of the sun. The author thinks that there is ground for the belief that there may be special forms of solar activity not yet fully understood, which exercise powerful terrestrial effects independently of the amount of solar heat falling upon the earth as a whole, and which may be of the nature of electro-magnetic induction, and depend upon conditions different from those which appear in the case of simple radiation from a source of combustion. If the variation in weather types follow the solar electro-magnetic record, he thinks that it would not be unwise to approach the problems from this side of the question, although it would involve a reconsideration of the facts of meteorological science from a standpoint different from that of an assumed variability of solar heat. The author considers that it may be necessary o discard provisionally the accepted theory of the origin of storms, in order to determine the part which electro-magnetic induction of solar origin plays, independently of heating effects. In any case, the study of periodic and non-periodic fluctuations in latitude of the cyclonic and anti-cyclonic belts surrounding the earth is most important in many ways.

A CONVENIENT modification of the hydrometer method of determining the densities of gases has been devised by M. Meslans, whose apparatus is described and illustrated in the *Comptes rendus*, No. 11. It consists of two hollow spheres hung to the arms of a balance. Each sphere, which is made of glass, aluminium, or gilt copper, hangs in a separate compartment, the suspending thread being introduced through a hole in the lid. The compartments are enclosed in a box and surrounded by water in order to keep them at equal temperatures. They are at first filled with air to determine the position of equilibrium. The gas whose density is to be determined is then introduced through a long tube immersed in the water, and enters one of the compartments, having previously been dried. The gas is passed through in a slow and continuous stream, and if its density differs from that of air, the equilibrium of the balance is disturbed. The weight necessary to re-establish equilibrium is noted, and the density calculated according to a simple formula. Thus the density is found by a single weighing, and by keeping the current of gas continuous any variation in its density is easily observed. A fairly high accuracy is attainable, depending upon the sensitiveness of the balance and upon the perfection of gauge of the spheres. One important application of the apparatus is that for determining the density and composition of the products of combustion in furnaces. The scale of the balance is graduated so as to show at a glance the percentage of carbonic acid, and hence the degree of efficiency of the furnace in question. This percentage, which is 21 theoretically, never exceeds 18 in practice, except in gas generators. In a great number of works it varies between 6 and 8. M. Meslans' apparatus is being applied to the study of the various methods of heating. Another application is that by which the presence and percentage of marsh-gas is indicated. With spheres of 1 litre capacity and a balance sensitive down to half a milligramme it was found possible to detect 0·1 per cent. of methane in the air of a mine.

THE *Electrical Review*, in the course of an article on "Electrical Engineering at the World's Fair," describes the curious rotary effects of a two-phase alternating-current field-magnet. A ring-armature is wound with four coils, connected in pairs across the circle; one pair is connected to one of the two-phase currents, the other pair to the second current. The ring-armature is then laid horizontally on a table, and a board placed over it. Almost any metallic article placed on the board immediately begins to run round above the ring. Copper balls, coins, &c., or any other easily movable conducting article will at once get into motion.

THE October number of *Mind* contains an article on theories of light-sensation, by Mr. C. L. Franklin.

MR. GEORGE HOGBEN has sent us two papers extracted from the Transactions of the New Zealand Institute, 1892, and referring to earthquakes experienced at the Antipodes in June, July, and December, 1891.

THE lecture on "The Interdependence of Abstract Science and Engineering," delivered by Dr. W. Anderson, F.R.S., at the Institution of Civil Engineers, in May last, has been extracted from the Proceedings of the institution, and is now published separately.

A COURSE of lectures upon Planetary Astronomy, with especial reference to "The Planet Venus" will be delivered in the theatre of Gresham College, on the evenings of October 24, 25, 26 and 27, by the Rev. E. Ledger.

A HANDY book on "The Art of Projection and Complete Magic Lantern Manual," by an expert, has been published by Mr. E. A. Beckett, Kingsland-road, N.E. Lantern operators will find in it many useful hints upon matters of manipulation.

MESSRS. WHITTAKER AND CO. have published the "Principles of Fitting," for apprentices in engineering and students in technical schools, by a Foreman Pattern Maker. The book is profusely illustrated, and should be of great assistance to the workers for whom it is intended.

STUDENTS preparing for the examination in the "Principles of Mining" held by the Department of Science and Art, or for colliery managers' examinations, are recommended to use an elementary text-book of "Coal Mining," by Mr. Robert Peel, just published by Messrs. Blackie and Son. The book is very well written and quite trustworthy.

A DAINTY brochure, by Martha F. Sesselberg, entitled "In Amazon Land," and containing adaptations from Brazilian writers, with original selections, has been published by Messrs. G. P. Putnam's Sons. The part of the book of interest to us refers to Amazonian legends, beliefs, traditions, and superstitions.

A SECOND edition of "An Introduction to Human Physiology," by Dr. A. D. Waller, F.R.S., has been published by Messrs. Longmans, Green and Co. Several alterations and transpositions of text have been made, and the results of many recent investigations have been included, thus giving additional value to an already highly appreciated work.

WE have received the Transactions of the Sanitary Institute, vol. xiii. The volume consists chiefly of reprints or abstracts of the papers read at the conferences which were organised in connection with the congress held at Portsmouth in 1892. It also includes an address to sanitary officers, delivered by Sir Douglas Galton at Worcester.

A CLASSIFIED list of plants in the Royal Botanic Gardens, Trinidad, has been issued as a *Bulletin of Miscellaneous Information*, No. 17, by Mr. J. H. Hart, the Superintendent. The list contains the names of plants under cultivation and indigenous in the Gardens, and is of scientific as well as economic interest.

DR. KICUCHI, of Tokyo, has just published, in Japanese, a text-book on Trigonometry, thus carrying on the good work he has begun in his manuals on Geometry, Logic, &c., and in his translations of "Clfford's Common-sense of the Exact Sciences," of "Russell's Technical Education," &c. The degree of Rigakuhakushi (= D.Sc.) is a degree conferred by the Minister of Education with the advice of the Council of the University.

LIEUT. J. P. FINLEY has prepared a report on "Certain Climatic Features of the Two Dakotas" for the U.S. Department of Agriculture. The report is illustrated with 163 tables, charts and diagrams, and it presents a vast amount of information concerning the meteorological phenomena which are believed to have a marked influence upon the agricultural interests of the States investigated. From the report it appears that the Dakotas should at once resort to an extensive system of irrigation in order to increase the precipitation and check the high evaporation. Forests ought also to be preserved, and extensive plantings of trees should be made. In the words of the report, "The meteorological and physical features of the Dakotas are such that, under the influence of settlement and the consequent development of agriculture, changes are effected which tend to the rapid dissipation of the moderate rainfall, through absorption and evaporation. Irrigation and reforestation are the only remedies."

THE disinfecting properties of peroxide of hydrogen have long been known, but considerable additions have been recently made to our more exact information concerning its bactericidal action. Richardson (*Chem. Soc. Journal*, Sept. 1893) has shown that the antiseptic action of sunlight on urine is due to the production of peroxide of hydrogen, for samples exposed to sunshine remained clear, and on examination were found to contain peroxide, whilst similar samples kept in the dark became turbid and contained no peroxide. Traugott, in "Einige Ergänzungen zur Praxis der Desinfection" (*Zeitschrift für Hygiene*, vol. xiv. 1893, p. 427), points out as the result of his investigations that this material may be substituted in all cases for corrosive sublimate and carbolic acid where the period of contact is not less than a quarter to half an hour; but that it is not suitable where rapid disinfection is required, as in the case of the disinfection of the hands, &c. Being innocuous and also harmless as regards clothing and the like, it is a safer disinfectant for general application than the former; its cost is, however, considerably greater. Some years ago, Heidenhain stated that he had constantly used peroxide of hydrogen as a gargle in cases of diphtheria, and Traugott mentions in his memoir that ten seconds' contact of a 2 per cent. solution of H_2O_2 with a young and vigorous growth of the diphtheria bacillus on blood serum, entirely destroyed this organism. If however two days' old cultures were similarly treated, contact for thirty minutes, even when repeated three times, was not sufficient for its annihilation. Thus the therapeutic value of this material consists in its immediate application at the very outset of the disease, whilst it may be recommended as an important prophylactic during epidemics of diphtheria.

AS regards the hygienic importance of peroxide of hydrogen, and its practical application, the experiments of Van Tromp and, later, Altehoefer on its action upon bacteria, pathogenic and otherwise, in water are of much interest. Van Tromp mentions that an addition of peroxide of hydrogen in the proportion of 1 : 10,000 parts of the water, when shaken up and allowed to stand for twenty-four hours, is usually sufficient to sterilise a water. Altehoefer, however, found that to ensure sterility it was advisable to use larger quantities, viz. 1 : 1000 parts of the water. Experiments made with waters purposely infected with cholera and typhoid bacilli, respectively, showed that in both cases these organisms were destroyed after twenty-four hours by this proportion of peroxide of hydrogen. Altehoefer, moreover, specially mentions that he found this addition in no way interfered with the dietetic value of the water, and recommends its application for household purposes as a protective measure during any epidemics of typhoid fever and cholera. Traugott also testifies to the innocuous character of this material even when swallowed in large doses, and states that 100 grm. or half a wineglassful of a 5 per cent. solution was administered by one of the doctors in a hospital in Breslau without any ill-effects whatever, whilst undoubted benefit was derived from its use. Care must, however, be taken that the particular material employed is as pure as possible, as traces of the poisonous barium chloride in larger or smaller quantities may be present; moreover, it is important that the sample should be freshly prepared, as its strength and consequently bactericidal action is reduced when it has been preserved for some time.

WE are indebted to *The Gas World* for the following particulars concerning a remarkable process, which is now being successfully worked, for very considerably increasing the illuminating power of coal gas, involving what at first sight would appear the highly dangerous operation of introducing into the gas a quantity of pure oxygen. In the year 1890 Mr. Edward Tatham, of New South Wales, made the bold proposal to add considerable quantities of pure oxygen to warm, heavy oil gas, with the object of producing a stable gas of very high illuminating power. Later in the same year Dr. L. T. Thorne communicated to the Gas Institute the results of preliminary experiments with this gas, which he had carried out on behalf of Brin's Oxygen Company. These experimental results led to the conclusion that rich oxy-oil gas *per se* was far and away more effective as an illuminant than the coal gas now employed for this purpose, but that its more immediate prospect of use lay in the direction of enhancing the lower illuminating power of ordinary coal gas. Preparations have since been made for practically testing the applicability of oxy-oil gas to the enrichment of coal gas, and the Hydro-Oxy Gas Patents Proprietary, Limited, have erected at 11, Salisbury-square, E.C., a complete experimental plant for the purpose. Moreover, the corporation of Huddersfield are erecting a plant for the purpose of enriching the coal gas supplied to the borough. The Huddersfield installation is not yet completed, but a portion of it is ready, and is now in actual operation. When complete it will consist of an oxygen plant and four bays of oil-gas retorts, capable collectively of producing 200,000 cubic feet of oxy-oil gas per day, together with the necessary condensers and holders. The oxygen plant has been already erected by Brin's Oxygen Company, and is their newest type of producer. It is built in two sections, which may be worked together or independently, and will make no less than 30,000 cubic feet of oxygen per day. This, the largest oxygen-producer ever constructed, is now in active operation. Of the oil gas plant one bay, consisting of fifteen cast iron retorts, is also working, and is capable of producing 50,000 cubic feet of oil gas per day. The lowest and hottest of the retorts are intended for "cracking" the residues from the upper retorts, but they may of course be fed with clean oil if required. The oxygen is introduced into the oil gas soon after the latter leaves the retorts and while still warm; the mixed gases then pass together through the condensers. The admission of the oxygen is automatically adjusted by means of a combination of meters, so that the proportion is constantly maintained at fifteen per cent. The oxy-oil gas is stored in special holders, and it is arranged to admit it into the coal gas just before the entry of the latter into the station meter, the quantity being regulated by a meter coupled to the station meter. The results so far attained are highly satisfactory. The admission of about six per cent. of oxy-oil gas is already found to increase the illuminating power of the corporation gas by the equivalent of five and a half candles, and this is probably much below the enrichment which will eventually be attained when the plant is complete, and when normal coal can again be employed at the cessation of the strike. The results attained by the Salisbury Square plant are considerably superior to this, and it is expected that the Huddersfield installation will eventually attain the same standard. Further, a marked increase in the stability of the gas is observed, for poor coal gas actually loses more illuminating power by storage than the same gas admixed with oxy-oil gas does. As regards cost, it is calculated from the experimental data furnished by the working portion of the Huddersfield installation, that the increased cost of production of the gas so enriched will not, at the highest estimate, exceed a third of a penny per thousand cubic feet.

Notes from the Marine Biological Station, Plymouth.—Last week, like its immediate predecessors, was characterised by stormy weather, which confined the dredging operations to inshore areas. The chief capture was a large haul of the Opisthobranch *Oscanius* (*Pleurobranchus*) *membranaceus*. The approach of winter is already indicated in the bottom fauna: colonies of the Compound Ascidian *Fragarium elegans* have been frequently taken in their state of "hibernation," and the colonies of the Polyzoan *Bugula turbinata*, which in the summer orms extensive forests on the stones in certain areas, have now almost completely died down. The Nemertine *Amphiporus dissimulans* has begun to breed, and the greater number of *Micrura fasciolata* are full-grown and sexually mature.

The additions to the Zoological Society's Gardens during the past week include two Sykes's Monkeys (*Cercopithecus lbigularis*, ♀ ♀) from West Africa, presented by Mr. W. H. Barber; a Thick-furred Capuchin (*Cebus vellerosus*) from South America, presented by Mr. R. Kettle; three Tigers (*Felis tigris*, ♂ ♀ ♀) from India, presented by H.R.H. Princess Beatrice; a Senegal Parrot (*Pœocephalus senegalus*) from West Africa, presented by Mrs. Rylands; a Ruddy-headed Goose *ernicla rubidiceps*, ♂) from the Falkland Islands, presented y Mr. Henry Phillips; a Tuatera Lizard (*Sphenodon punctus*) from New Zealand, presented by Mr. C. Stonham, F.Z.S.; a Diamond Snake (*Morelia spilotes*) from New South Wales, presented by Mr. Arthur W. Darker; a White-fronted Lemur (*Lemur albifrons*) from Madagascar, two Common Squirrels (*Sciurus vulgaris, albino*) British, deposited; two Blue-winged Teal (*Querquedula cyanoptera*) from South America, a Japanese Teal (*Querquedula formosa*) from North-east Asia, a Himalayan Monaul (*Lophophorus impeyanus*) from the Himalayas, a Turnstone (*Strepsilas interpres*), a Curlew (*Numenius arquata*) European, purchased; a Molucca Deer (*Cervus moluccensis*) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

The Scintillation of Stars.—Though the question as to the cause of the scintillation of stars has not received the attention of many workers, yet it has had and still retains its adherents. In a recent number of the *Revue Scientifique*, M. Dufour gives the results of observations commenced in the year 1853. The observations were made with the naked eye, and were continued in all seasons and in all conditions of the weather, since the chief object of the investigation was to find out whether there was any relation between the scintillations of stars and the disturbances which occur in our atmosphere. The first results which were obtained led to the forming of the following laws. (1) That red stars scintillate less than white stars. (2) The intensity of the scintillation is nearly proportional to the product obtained by multiplying the astronomical refraction for the height at which the star appears, by the thickness of the stratum of air traversed by the luminous ray that one is considering, and (3) that the causes of some of the essential differences between the scintillations of different stars may perhaps be due to the stars themselves. Experiments for studying the question as to whether there was any difference between the scintillation on mountains and upon the plain, showed that on the mountains the scintillation was most feeble. An important meteorological conclusion, which, as M. Dufour says, is contrary to general opinion, and which he deduces from his numerous observations, is that a feeble scintillation generally announces the approach of bad weather. He gives many instances in support of his view, among which occur the observations at Col du Géant on July 12, 1788, when the brightest stars in Lyra, Cygnus, and the Eagle at the same altitude showed practically no signs of scintillating, while the next day there broke out over France the most violent storm that the annals of meteorology had ever registered. M. Dufour compares his work with that of M. Montigny, who commenced work after him, and who was led to the same three laws above mentioned. He suggests that as his observations were made in Switzerland, it would be interesting to find out if a feebleness of scintillation observed at sea also indicates bad weather.

A Universal Telescope Stand.—The construction of a good and simple universal mounting for small telescopes has been the aim of many instrument makers, and it is pleasing to note an advance in this direction made by the firm of K. Fritsch, formerly Prokesch, in Vienna. In their new so-called "*Universal statio*" they have overcome many of the main difficulties. The chief point about this special kind of mounting is that the observer can either use the telescope as a theodolite—that is, with circles reading altitude and azimuth—or, by a slight adjustment, he may have the equatorial mounting where the circles read right ascension and declination. This end is gained by hinging what would be the polar axis on to a pivot at the side of the stand, thus allowing the axis to be moved from the horizontal to the vertical or any intermediate position. A strong metallic arc fixed on the top of the stand supplies a means of clamping this axis, and giving it a slight adjustment. With the axis vertical, we have then practially a theodolite mounting; with the axis out of the vertical, a parallactic mounting. It is needless to say that this mounting is only for small telescopes, and indeed its application to large ones is not needed. A detailed account of the mounting, with figures, will be found in No. 208 of *Prometheus*.

Popular Astronomy.—Some time ago we inserted a note in this column to the effect that the editors of *Astronomy and Astro-Physics*, if they received sufficient support, would publish a monthly journal—*Popular Astronomy*—written especially for